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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 23293-2021

Replacing GB/T 23293-2009

Nitride bonded refractory products and their related mortars

氮化物结合耐火制品及其配套耐火泥浆

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Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part

1. Structure and Drafting Rules of Standardization Documents" Drafting. This document replaces GB/T 23293-2009 "Nitride Bonded Refractory Products and Its Supporting Refractory Mud", and is compatible with GB/T 23293-2009. In comparison, the main technical changes are as follows:

- a) Modified the scope of application of the standard (see Chapter 1, Chapter 1 of the 2009 edition);
- b) Added the definition of refractory mortar for nitride-bound refractory products (see 3.2);
- c) Added J-DGT, J-DWT and JN grades and their technical indicators (see Chapter 4, Table 1, Table 2 and Table 3);
- d) Added the batch average value (μ) and batch standard deviation estimate (σ) of the qualified quality of nitride-bound refractory products (see Table 2);
- e) The chemical composition of nitride-bound refractory products and supporting refractory slurries has been added as acceptance inspection items (see 7.2.3). Please note that some of the contents of this document may involve patents. The issuing agency of this document is not responsible for identifying patents. This document was proposed and managed by the National Refractory Standardization Technical Committee (SAC/TC193). This document was drafted by: Sinosteel Luoyang Refractory Research Institute Co., Ltd., Sinosteel Luonai Technology Co., Ltd., Shandong Refractories Group Lunai Ceramics Co., Ltd., Yixing Yuxi Ceramics Co., Ltd., Shandong Bayan Special Refractory Material Factory. The main drafters of this document: Wen Biao, Cao Huiyan, Wan Longgang, Wang Peng, Zhai Wanyu, Xu Dayan, Wang Wenxue, Cai Guoqing, Qin Jiantao, Jiang Yuqing, Yu Yingjun, Fu Ruyan, Wang Lin, Li Yuhuai. The previous versions of this document and the documents replaced are as follows:

--- First published as GB/T 23293-2009 in 2009;

---This is the first revision. Nitride-bonded refractory products and their Matching refractory mud

1 Scope

China's national product standard for nitride bonded refractories and the mortars that go with them. It specifies the classification, the technical requirements, the test methods, the inspection rules and the marking, packaging, transport and storage of nitride bonded refractory products and their matching mortars. Most refractory bricks are bonded ceramically - fired so that the grains sinter together - or with a chemical or carbon bond. A nitride bond is different: silicon powder in the mix is nitrated during firing in a nitrogen atmosphere, and the silicon nitride formed grows as interlocking needles through the pores, binding the aggregate together. What that produces is unusual. The bond has high strength and it keeps it at temperature rather than softening; it is not wetted by molten aluminium or by cryolite, and it resists alkali vapour and carbon monoxide attack. So the material occupies the places where an ordinary refractory fails fast: the sidewall of an aluminium reduction cell, where the cryolite bath dissolves almost everything else; the lower stack and bosh of a blast furnace, where alkali and carbon monoxide destroy conventional brick; and kiln furniture that has to carry load hot. The mortar is in the same standard for a functional reason rather than a commercial one - a joint made with an ordinary silicate mortar between two nitride bonded bricks is attacked by exactly the media the bricks resist, so the lining fails at the joints while the bricks are intact, and the mortar has to be matched to the brick. The requirements accordingly cover the nitrogen and silicon nitride content, the bulk density and apparent porosity, the cold and hot strength, the thermal shock resistance and the resistance to the specific attack each grade is made for. Issued on 21 May 2021 and in force since 1 December 2021, it replaces GB/T 23293-2009.

This document specifies the terms and definitions, classifications and grades, technical requirements, and tests of nitride-bound refractory products and their supporting refractory slurries. Methods, quality assessment procedures, packaging, marking, transportation, storage and quality certificates. This document is applicable to nitride-bonded refractory products and supporting refractory slurries used in electrolytic aluminum, steel, ceramics, coking and other industries.

2 Sampling

GB/T 5072 Test method for compressive strength of refractory materials at room temperature

GB/T 5990 Test method for thermal conductivity of refractory materials (hot wire method)

GB/T 6900 Aluminium-silicon refractory chemical analysis method

GB/T 7321 Preparation method of shaped refractory product samples

GB/T 10325 Sampling inspection rules for acceptance of shaped refractory products

GB/T 10326 Inspection method for size, appearance and section of shaped refractory products

GB/T 14983 Test method for alkali resistance of refractories

GB/T 15545 General provisions for packaging, marking, transportation, storage and quality certificates of unshaped refractory materials

GB/T 16546 General provisions for packaging, marking, transportation, storage and quality certificates of shaped refractories

GB/T 16555 Chemical analysis method for carbon, silicon carbide, nitride refractory materials

GB/T 22459.3 Refractory mortar Part

3 Terms and definitions

The following terms and definitions defined in GB/T 10325 apply to this document.

3.1 Nitride bonded refractory product Silicon nitride, Sialon, silicon oxynitride, etc. and their composite nitrides are used as the binding phase, silicon carbide or corundum is the main crystal phase, and the main crystal

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GB/T 22459.5 Refractory mud part 5. particle size distribution (sieve analysis) test method

GB/T 22588 flash method to measure thermal diffusivity or thermal conductivity YB/T 5012 Shape and size of refractory bricks for blast furnace and hot blast stove